

**Testimony of Thomas R.
President, and Chief Executive Officer**

Before the U.S. House of Representatives

Subcommittee on Energy and Power

Chicago, Illinois

Summary of Key Points

- Combined heat and power (CHP) plants will become the new paradigm and ultimately render most central plants obsolete.
- Regulation and monopoly protection has led to the production of electricity and heating in separate plants, resulting in wasted energy resources and increased pollution.
- A restructured electric industry will allow market forces to drive energy conversion to greater efficiency.
- Distributed, combined heat and power provides dramatic energy cost savings for the consumer.
- Federal legislation is essential to:
 - assure consistency across the nation
 - provide for a truly competitive environment
- Efficiency is encouraged with a “fossil fuel reduction portfolio” requirement that allows the market to decide how best to save fuel at the least cost.

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President, and Chief Executive Officer
Trigen Energy Corp.**

**Before the U.S. House of Representatives
Committee on Commerce
Subcommittee on Energy and Power**

**Hearing on Electric Utility Industry Restructuring
Chicago, Illinois**

May 2 1997

Introduction

Chairman Bliley, Chairman Schaefer, and members of the subcommittee, good morning. My name is Tom Casten and I am the president, and chief executive officer of Trigen Energy. Thank you for inviting me to speak here in Chicago at your third field hearing on the benefits of electricity restructuring.

I believe that Trigen is in a good position to show the Committee some of what competition will do to generation. It is certain that electric rates will be lower than they are today for the majority of Americans. There will be less reliance on our extensive national electric distribution network and the country will move to small, distributed combined heat and power plants that use the same fuel twice – once to make electricity and once to make heat. Our nation will be less reliant on foreign oil and we will greatly reduce air pollution from the energy sector. I know this is the future because Trigen has been moving down this road to doubled efficiency for twenty years and the only thing that has kept this road an alley instead of a superhighway is monopoly protection of the electric utilities. As competition is unleashed, distributed combined heat and power plants will become the new paradigm and will ultimately render most central plants obsolete.

Trigen Energy is the leading thermal sciences company in North America. We own and operate 24 energy plants and use our expertise in thermal engineering and proprietary cogeneration processes to convert fuel to various forms of thermal energy and electricity at more efficient conversion rates than conventional processes. We operate some of the most efficient facilities in the United States including the Trigen-Peoples District Energy Center here in Chicago which produces steam, chilled water (for air conditioning) and electricity with a 90+% fuel conversion efficiency. We own and operate the downtown district heating systems in Boston, Baltimore, Philadelphia, Kansas City, St. Louis and Prince Edward Island, Canada. We own plants which provide district heating, cooling and electricity in Trenton, NJ, Oklahoma City, OK, Tulsa OK, Nassau County, NY and London, Ontario. We also own and operate the energy assets of the Coors Brewing Company in Golden, Colorado.

A Brief History

How did the Central Power plant paradigm emerge and why do we as a nation waste two thirds of all the energy in the fossil fuel we use to generate electric power? The answer may surprise you.

From 1880 to 1960, average U.S. generating efficiency improved from 8% to 35% but then fell to 29% and has since stagnated. Over a 70 year period, or more significantly, over the lives of five to ten generations of regulators, boards, CEO's and legislatures, the technology of central generation improved and society benefited. It was during this time of technological advancement that attitudes about monopoly regulation and how to make power were set in stone.

With the emergence of nuclear plants, efficiency stopped climbing, and started to regress such that by 1973, 29.5% of the input fuel was delivered to end users as electricity with the remainder being wasted as heat into the environment. In the past two decades, which saw phenomenal advances in human knowledge and in technology in every non-regulated area, there was virtually no progress in utility generating efficiency. By 1994, overall utility generating efficiency was 33%.

What this has meant for the nation is that for every 100 units of fuel energy that enter any power plant, 33 units emerge as useful electricity, and 67 units of energy are wasted and add unnecessary pollution to the environment. In response to this wasteful practice, the Carter Administration coined the term, “Cogeneration” which simply means the combined generation of heat and power. However, the adoption of cogeneration by the utilities has been limited.

To understand why our nation continues to generate most of our electric power so inefficiently, we need look no farther than regulation. Fifty years of monopoly regulation stifled innovation and insulated the industry from any new technology that demonstrated power could be generated on site – that demonstrates that the monopoly should end. Only technologies that complemented central generation were supported by the utilities.

The role of energy generation efficiency

By combining the generation of heat and power, efficiencies double and can even triple. This is what must happen to all energy conversion. Regulation and monopoly protection have allowed the electric industry to inefficiently and separately produce electricity and leave heating to individual users. Does the idea of having one plant producing electricity and a separate plant

producing heat make sense? No! All generating processes that convert fuel to electricity also produce heat. The best known electric-only technology converts just 60% of the fossil energy to electricity, and the average plant in the U.S. converts only 33% of the fossil energy to electricity. These plants waste dollars and then society burns additional fuel to make the heat we just threw away. By combining heat and power, the same 100 units of fuel are used to produce three (3) energy products -- electricity, steam, and chilled water and only 10% of the fuel is wasted. The real bonuses are that (1) the cost of each commodity is reduced because the fuel is used more efficiently and (2) the total pollution emitted to produce these products is greatly reduced.

The opportunities for combined heat and power are huge and can have a significant impact on the competitiveness of all U.S. industry. Indeed, we estimate that if combined heat and power were applied to just the industrial heat loads in this country, it would result in an additional 80,000 MW of capacity with 640 million MWh per year, 18 % of the nations 1995 electricity output. In addition, we estimate that this same action would reduce CO₂ emissions by over 400 million tons per year.

With full retail access, market forces will drive all energy professionals to greater efficiency. In a free market environment, many firms will find that distributed combined heat and power is the low-cost solution. Indeed, many utilities are beginning to agree. Trigen has established utility partnerships to combine heat and power with the Philadelphia Energy Company (PECO), NRG Energy (a subsidiary of Northern States Power), Nations Energy (a subsidiary of Tucson Electric) and Peoples Gas, here in Chicago. Last year, Trigen and Cinergy formed a joint venture partnership to develop combined heat and power throughout the US. Last year Trigen also partnered with Hydro Québec in the New England states to build combined heat and power

plants. These utilities are investing money in these projects with Trigen because they believe combined heat and power is the way to produce competitive electricity in a free market.

Will Consumers Benefit

How economic is combined heat and power? Combined heat and power generates power with capital recovery at less than the marginal cost of existing central plants. Combined heat and power market penetration is held back by inertia, the old central generation paradigm and mostly by monopoly restrictions.

In the current regulated market, the marginal costs of power from existing central plants before capital recovery has a fuel cost of roughly 2.2 cents per kWh, and the transmission and distribution cost adds 1.5 cents for a total of 3.7 cents per kWh. Compare this to a new combined heat and power plant which has a lower fuel cost due to recovering and selling heat. After capital cost recovery, the plant can sell power for a total cost of 2.6 cents a kWh including fuel and transmission, at below the marginal cost of central generation. These economics illustrate how free markets will reduce generating costs so as to “strand” existing generating assets. These very efficient and clean plants are held back today by monopoly regulation. As retail access begins, they will be the most competitive in the marketplace.

To determine the savings to the U.S. consumer, let’s look at the market. In 1995, the annual electric sales in the US were \$207 billion, while heating sales were \$157 billion. The total market was \$364 billion. When combined heat and power is applied to these markets, a savings of at least 10%, or \$37 billion will be offered, in order to persuade heat users to sign contracts.

Five other industries have had regulations eased since 1960, and ten years later, their prices in real terms dropped by 27% to 57%. Deregulation will save U.S. energy consumers at least 27% or roughly \$100 billion per year. The savings could reach \$200 billion per year in real terms if they follow the results of interstate telephone prices.

Is Federal Legislation Needed?

Federal legislation is badly needed. Electricity is the ultimate interstate commodity flowing across the country. Trigen believes that the power industry needs consistent rules from state to state. In addition, it is critical that the regulatory jurisdiction between the federal and state governments be defined. Finally, local utilities with monopolies have too much power at the state level. Federal oversight is needed to ensure that a truly competitive environment is established.

Elements of Federal Legislation

Trigen is generally supportive of the current HR 655 “Electric Consumers Power to Choose Act of 1997”. I would like to spend a few moments to highlight a few key issues.

Stranded Costs

The argument for stranded cost recovery is that incumbent utilities, which invested in uneconomic power plants, are entitled to recover from rate payers the excess of embedded costs over market value because these plants were built with the legitimate expectation of cost recovery from rate payers. The theory does not square with reality.

Uneconomic power plants were built primarily because utilities proposed to build them, not because regulators granted certificates of public convenience and necessity allowing them be built. Moreover, utilities were only entitled to the *opportunity* to recover a return on plant investments, assuming they were prudently incurred and used and useful in providing utility service, not a guarantee.

The consumers have been paying for these bad decisions ever since the plants were built. Should they now completely bail out those who made the bad decisions? Trigen fundamentally disagrees with the concept of stranded costs and opposes allowing utilities to recover every mistake they made. Their low efficiency record does not deserve a reward. If the market price of utility assets is lower than their book cost, this implies that utilities were not good stewards – they built inefficient plants. And now they blame regulation. We disagree. These over-recoveries should not be allowed to persist in a competitive environment.

To the extent some concept of stranded costs is upheld, several guiding principles should be employed in determining whether and to what extent recovery should be allowed. First, utilities should not be allowed to recover any money for a stranded plant unless they sell it. Then a transition cost that covers one-half of the difference between book value and sale price could cover whatever society owes the utility. Unlike full stranded cost recovery which is without incentive, this approach will force every owner to innovate. The bottom line is that utilities should not be insulated from the risks that they have always incurred as regulated utilities such as self-generation, cogeneration or industrial plant closure that do not arise from the implementation of retail competition. Second, only those assets whose costs were legitimately and prudently incurred should

be considered for stranded cost recovery. Third, assets whose book costs exceed market values should be offset against those whose market values exceed book costs, in determining whether any stranded costs exist in the first place. Fourth, stranded cost responsibility should be shared by utility shareholders, retail transmission customers, and remaining bundled sale customers of the incumbent utility. This approach would avoid the chilling effect on competition of imposing stranded costs exclusively on departing customers.

To encourage combined heat and power generation with twice the efficiency and half the pollution of central power, those who cogenerate their own loads or use third parties to cogenerate should be exempt from stranded cost payments. This formulation will send a strong signal to the market to build more efficient combined heat and power plants and thus lower CO₂ emissions and the trend toward global warming.

Stranded cost recovery should be allowed for certain non-utility power providers, that is, for PURPA-qualifying facilities that sell power to utilities at above-market prices. The utilities were not compelled to build uneconomic generation assets, but they are required under federal law to buy power from qualifying facilities at avoided cost rates established by state utility commissions. Given this critical distinction, stranded cost recovery should be allowed for power purchase contracts which contain rates significantly above current market prices.

While Trigen supports stranded cost recovery for above-market PURPA contracts, Trigen vigorously opposes any attempt to use non-utility generation as a justification for allowing utility stranded cost recovery on a broader scale. The non-utility generation

“problem” cited by many utilities is minuscule compared to the stranded investment recoveries sought for a range of other utility assets.

I want to reiterate that the greatest potential disincentive to widespread utilization of highly efficient combined heat and power facilities is the specter of stranded cost “transition charges” or “exit fees” which apply to those individuals and businesses that choose to combine heat and power.

Fossil Fuel Reduction Portfolio Alternative

Trigen believes that the objective of the Renewable Portfolio Standard is to reduce fossil fuel dependence and reduce air pollution. While we support the development of renewable energy wherever feasible, we believe a broader standard will allow the market to decide how best to save fuel at the “least cost” and force renewables and combined heat and power to compete.

Trigen requests that the Committee add high efficiency generation to the power that qualifies for the “Renewable Portfolio Standard”, and change the term to “Fossil Fuel Reduction Portfolio”. In order for plants to qualify, start with a requirement to achieve 65% efficiency. Then increase the standard every year, similar to the renewables percentage requirement. Parties subject to the law would then have a choice between investment in renewable energy or energy efficiency.

Retail Access by a Date Certain

Trigen strongly supports the notion that any federal legislation should dictate a “date certain” for full retail access throughout the country. This is the only way to ensure that an effective, equitable competitive market can be established.

Conclusions

There has been a standard approach of central generation to the electric business for so long that nearly everyone fails to see that distributed combined heat and power is better and will compete if given a chance. We believe that the old way of electric generation has finished its useful life and a new paradigm of distributed power will emerge, just as a new paradigm of distributed computing emerged (mainframes to laptops).

We cannot improve on the Executive Summary of the recently published study of five U.S. industries that were deregulated: *“Economic Deregulation and Customer Choice: Lessons for the Electric Industry.”*¹ Based upon a detailed review of the experience of deregulation in five network industries -- natural gas, long-distance telecommunications, trucking, airlines, and railroad -- the study reached five conclusions and drew five “policy implications,” as follows. In addition, the Study summarized dramatic evidence of price reductions. This evidence speaks for itself.

Finding: Deregulation and customer choice lower prices.

Policy Implication: Competition is desirable.

Finding: Deregulation and customer choice align service quality with customer desires.

Policy Implication: Service quality is no excuse for delay.

¹ *Brookings Study at 3-5.*

Finding: Consumers have experienced genuine benefits, not just reallocation of costs among customer classes.

Policy Implication: Transition costs are no excuse for delay.

Finding: The lower the barriers to customer choice, the greater benefits the customers receive.

Policy Implication: Choice for all customers for all competitive services will provide the most benefits.

Finding: Competitive markets continue to evolve in response to consumer needs.

Policy Implication: Open and competitive markets should be allowed to evolve.

Today, our society consumes 10,500 Btus of fossil fuel per kWh generated and not only wastes money, but also fills the atmosphere with CO₂ and other pollutants. Trigen's combined heat and power plants are consuming only 4,500 to 5,000 Btus of fossil fuel per kWh. These plants provide electricity at significantly lower prices than seen in the market today. As new combined heat and power plants are built near the customers, we will find that the electric transmission network is overbuilt. We will also see carbon dioxide emissions reduced. Deregulation and retail access for all electric consumers makes almost every one a winner. The only loser is OPEC.

Attachment 1

Thomas R. Casten

Curriculum Vitae

BIOGRAPHY

THOMAS R. CASTEN 89 Hillcrest Road
Hartsdale, NY 10530H: (914) 949-1634 B: (914) 286-6600

Work History 1986 - Present: President, CEO, and founder of Trigen Energy Corporation,
One Water Street, White Plains, NY 10601.

Trigen employs 635 people, had revenues in fiscal 1996 of \$242 million and earned \$12.1 million after tax. Trigen, a leading thermal sciences company, uses its expertise in thermal engineering and proprietary cogeneration processes to convert fuel to various forms of thermal energy and electricity at more efficient conversion rates than conventional processes. Trigen combines heat and power generation, producing electricity as a by-product, for use in its facilities and for sale to customers.

Trigen develops, owns, and operates district energy systems that serve multiple users with cogenerated electricity, heat and chilled water. The company serves more than 1,500 customers with energy produced at 24 plants in 14 locations, including industrial plants, electric utilities, commercial and office buildings, government buildings, colleges and universities, hospitals, residential complexes and hotels. Operating locations: Baltimore; Boston; Chicago; Cincinnati; Golden, CO.; Kansas City; London, Ontario, Canada; Nassau County, NY; Trenton; Tulsa and Oklahoma City; Philadelphia; St. Louis; Charlottetown, Prince Edward Island, Canada and six additional locations in Mexico. As a private company, Trigen was named by *INC.* Magazine as one of the 500 most rapidly growing small companies in the U.S.A. for four consecutive years (289th in 1990, 70th in 1991, 40th in 1992 and 489th in 1993). Trigen became a public company on August 12, 1994 on the New York Stock Exchange, raising \$58 million. In 1996, Trigen was recognized as the Competitive Power Company of the Year by the Association of Energy Engineers.

1980 - 1986: President and founder of Cogeneration Development Corporation, and Developer and Managing General Partner of Trenton District Energy Company.

1969 - 1980: Cummins Engine Company, predecessor to Trigen, Director of Corporate Strategy, COO of Irish Agricultural Development Corp., Vice President and General Manager, Cummins Cogeneration.

Casten was named Southern New England Entrepreneur Of The Year in a program sponsored by Ernst & Young, Merrill Lynch and *Inc.* Magazine. He has authored several reports and numerous articles on cogenerated district heating, including the article on Power Generation for the McGraw Hill Encyclopedia of Science and Technology's 1979 Yearbook, and a paper to ASHRAE on economical central chilling. He has provided expert testimony before Public Service Commissions, State Assembly Committees, U.S. Congressional Committees, State Legislatures and Federal Agencies on cogeneration and district energy, and has four times represented the DHC industry at the Aspen Institute Energy Policy Symposia.

Military U.S.M.C. 1964-1968. Captain, Force Engineers. Tour included one year in Vietnam as Battalion Design Officer. Naval commendation medal for outstanding design.

Education University of Colorado, B.A. Economics, Magna Cum Laude, 1964
Columbia University, M.B.A., Finance, Class Valedictorian, 1969

Affiliations Past President of the International District Energy Association 1993-94, leading association to 30% increase in membership.

Personal Married to Judith 32 years, three children and host to over 20 foster children; Founding Chairman of Westchester Philharmonic, a Symphony Orchestra now in its twelfth year, Eagle Scout and supporter of Westchester-Putnam Council of Boy Scouts. Avid gardener with focus on propagation of unusual species.

05/07/97

Attachment 2

Federal Grants and Contracts

Trigen Energy Federal Grants and Contracts Disclosure

In accordance with Rule XI, clause 2(g)(4) of the Rules of the House and Rule 4(b)(2) of the Committee rules, Trigen Energy is not in receipt on any federal grant or subgrant .

Trigen does have energy supply contracts for steam, hot water and/or chilled water, with the following agencies as follows (Note: these are paid as usage fee):

<u>Location</u>	<u>Agency</u>	<u>1997 (budget)</u>	<u>1996</u>	<u>1995</u>
<u>Baltimore, Md</u>				
Three (3) Federal Buildings	GSA	\$1,300,000	\$1,464,593	\$1,275,197
VA Hospital	VAA	\$ 780,000	\$ 787,782	\$ 720,305
Social Security Adm	SSA	\$ 400,000	\$ 419,417	\$ 387,275
<u>Boston, Ma</u>				
Three (3) Federal Buildings	GSA	\$1,200,000	\$1,340,781	\$1,119,965
Four (4) US Postal Service	USPS	\$ 800,000	\$ 857,165	\$ 737,847
Three (3) Park Service	NPS	\$ 71,500	\$ 73,433	\$ 70,221
<u>Kansas City, Mo</u>				
Three (3) Federal Buildings	GSA	\$ 653,130	\$ 653,130	\$ 653,130
<u>Oklahoma City, Ok</u>				
Federal Courthouse	GSA	\$ 400,000	\$ 427,113	\$ 348,564
<u>Philadelphia, Pa</u>				
US Mint	IRS	\$ 900,000	\$ 958,559	\$ 677,438
Two (2) Federal Buildings	GSA	\$ 250,000	\$ 269,392	\$ 210,173
Three (3) US Postal Service	USPS	\$ 640,000	\$ 676,004	\$ 224,791
Five (5) Park Service	NPS	\$ 210,000	\$ 206,688	\$ 617,409
Two (2) Amtrak		\$ 1,000,000	\$1,131,423	\$ 850,505
<u>St.Louis, Mo</u>				
Federal Building	GSA	\$ 720,495	\$ 944,826	\$ 601,939
<u>Trenton, NJ</u>				
US Post Office	USPS	\$ 41,000	\$ 42,820	\$ 40,415
<u>Tulsa, Ok</u>				
Federal Building	GSA	\$ 65,000	\$ 55,744	\$ 17,330